

6,000 GPM of Dewatering for 200-ft of Microtunneling Installed Pipe?

Ron Dorn, PE – BHC Consultants

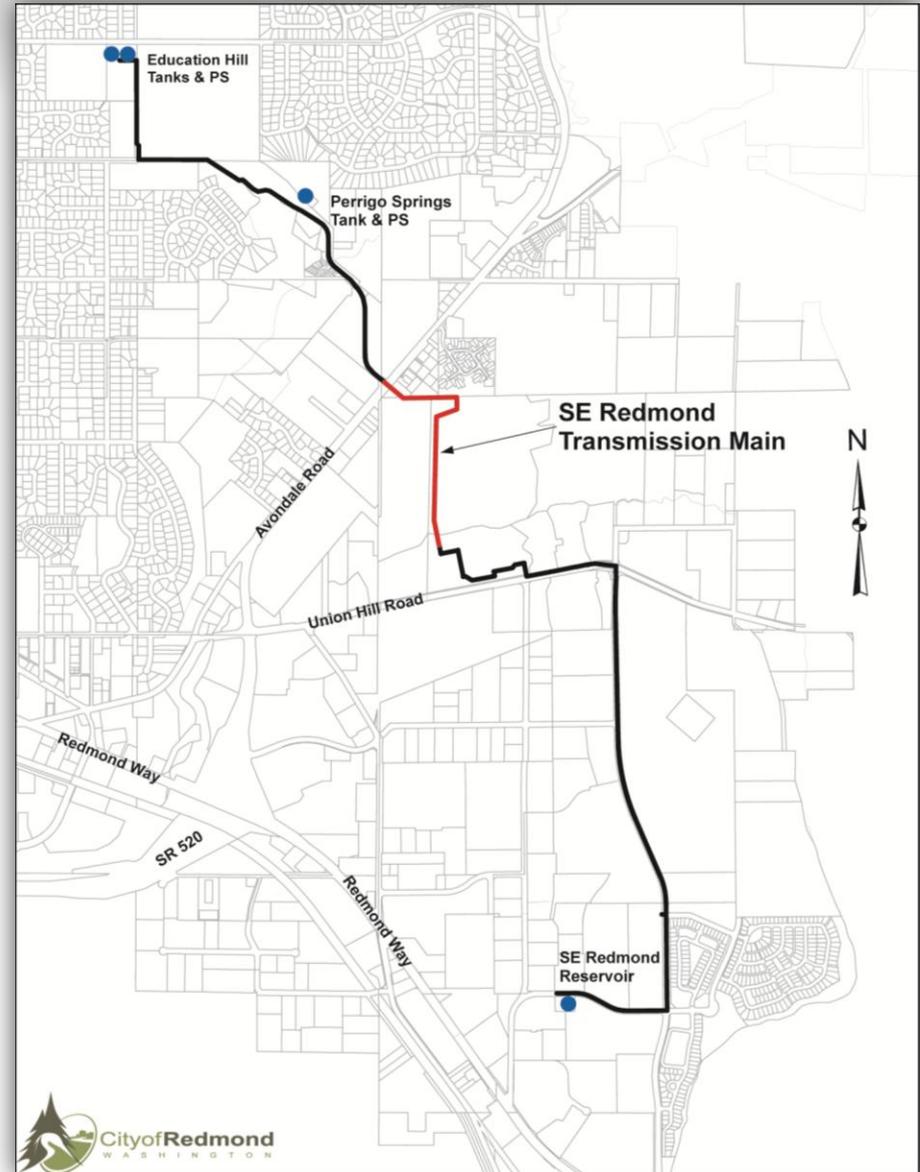


SE Redmond Transmission Main Project Team

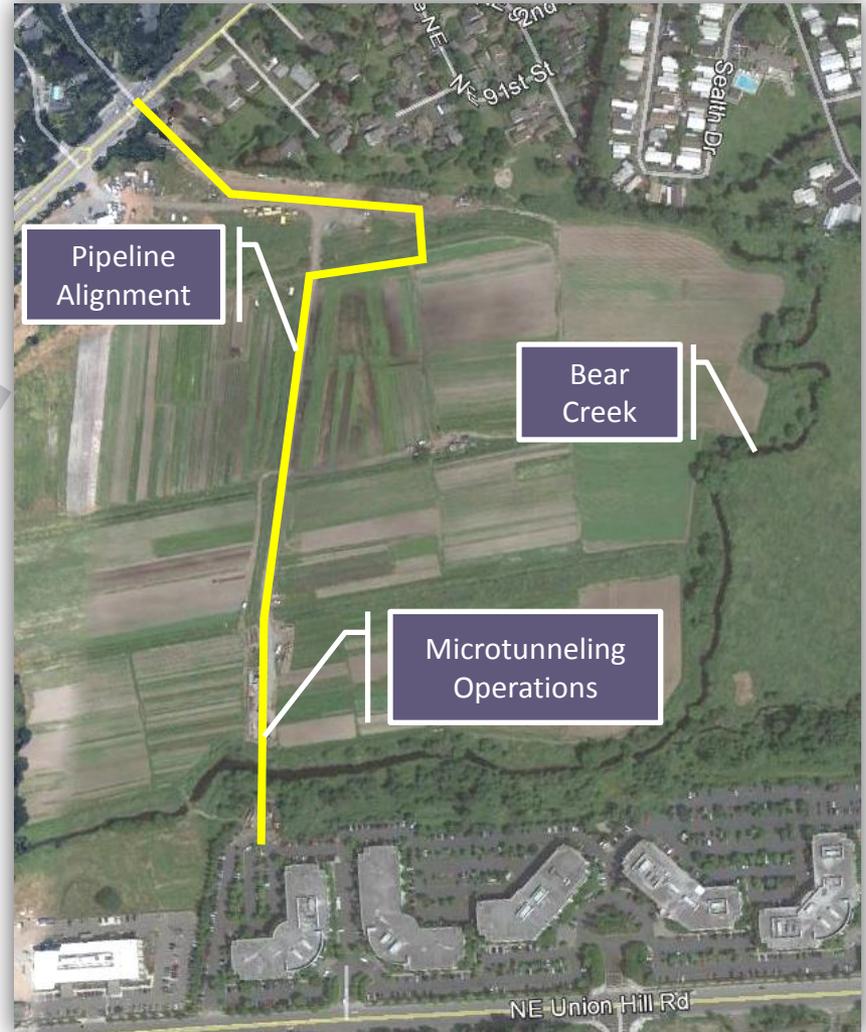
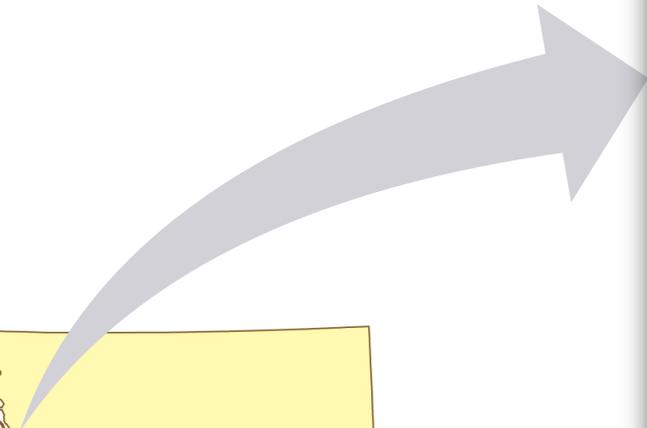
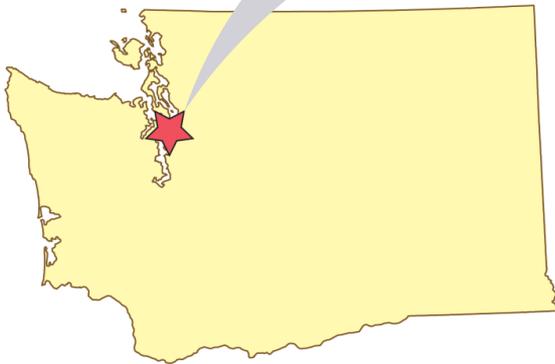
- City of Redmond – Owner
- BHC Consultants – Engineer
- Road Construction Northwest – Contractor

Need for Project

- Retirement community on Keller Farms property (project delayed)
- Additional fire flows
- Redundancy



Project Location



Design Criteria

- $Q_{\text{peak}} = 7,000 \text{ gpm}$
- Working Pressure = 200 psi
- Min Pipe ID = 20-inches
- Boost pressure and provide additional flow to future developments in southeast Redmond
- Additional fire flow



Design Issues

- Crossing Avondale Road – five lane major arterial
- Crossing active farmland/constructed wetland
- High groundwater
- Crossing and adjacent to sensitive areas
- Fish bearing agricultural ditches and major salmon stream (Bear Creek)
- Easement acquisition

Pipeline Alignment



Pipeline Alignment

- Avondale Road crossing
- Crossing active farmland
- Three agricultural ditch crossings
- Environmentally sensitive areas
- Microtunneling under Bear Creek



City of Redmond 180A VR 2013-04-25 17:20:30

180th Ave NE and Avondale Road

Courtesy of www2.redmond.gov/TrafficCameras/

Pipeline Alignment

- Avondale Road crossing
- Crossing active farmland
- Three agricultural ditch crossings
- Environmentally sensitive areas
- Microtunneling under Bear Creek



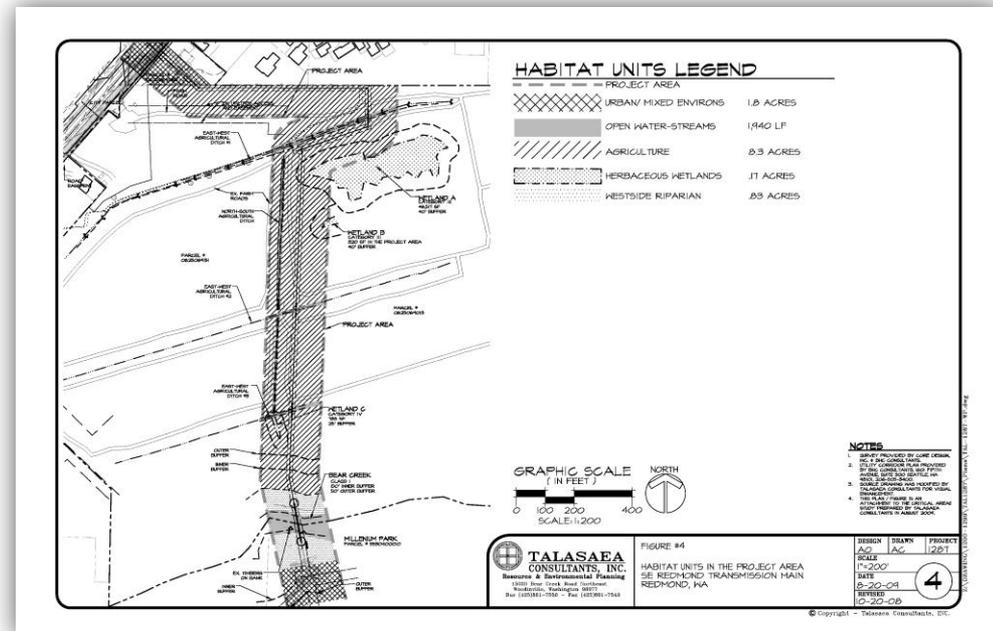
Pipeline Alignment

- Avondale Road crossing
- Crossing active farmland
- **Three agricultural ditch crossings**
- Environmentally sensitive areas
- Microtunneling under Bear Creek



Pipeline Alignment

- Avondale Road crossing
- Crossing active farmland
- Three agricultural ditch crossings
- Environmentally sensitive areas
- Microtunneling under Bear Creek

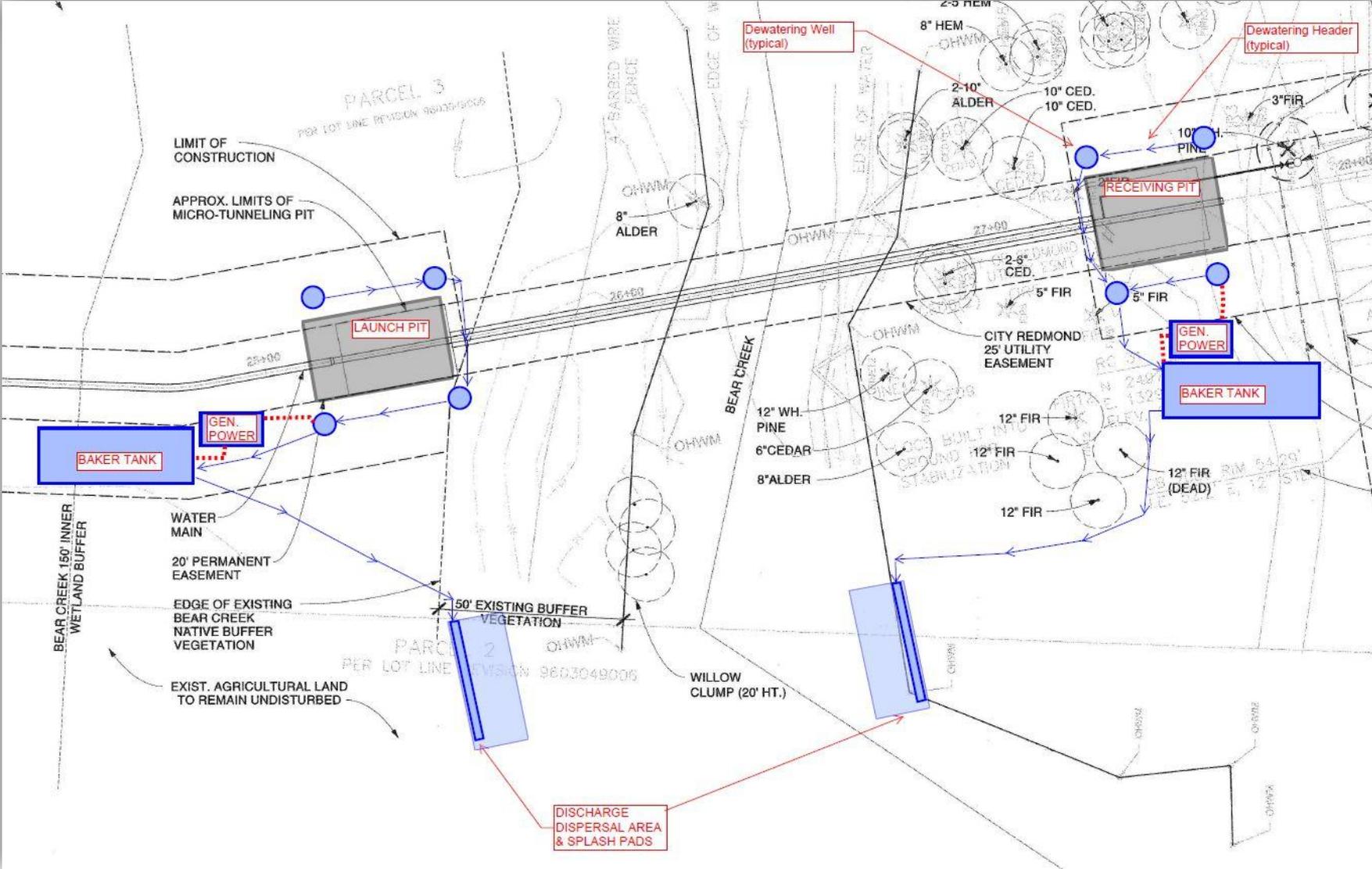


Pipeline Alignment

- Avondale Road crossing
- Crossing active farmland
- Three agricultural ditch crossings
- Environmentally sensitive areas
- **Microtunneling under Bear Creek**



Microtunneling Pits Dewatering



Dewatering Well Pumps



- Four 750 gpm well pumps per pit

Dewatering Discharge Piping



Pit Dewatering Baker Tanks



Pit Dewatering Settling Channels



Dewatering Pumps Settling Channels



Dewatering Pump Settling Channels



Discharge Into Agricultural Ditches



- Discharge to agricultural ditches then to Bear Creek
- Water quality from dewatering operations better than Bear Creek

Dewatering Costs



- Dewatering operations lasted for 2.5 months
- Total dewatering costs = \$418,000
- Total project costs = \$4,000,000
- ~10% of total project costs

Microtunnel Operations



Microtunnel Operations



Microtunnel Operations



Microtunnel Operations



Microtunnel Operations



Tunnel machine recovery – circled area is cutting head

Microtunnel Operations



Before tunnel machine recovery



During tunnel machine recovery

Microtunnel Operations



Bear Creek restoration (less than week after tunnel machine became stuck)

Restoration



Acknowledgments

- Jeff Thompson – City of Redmond
- Dennis Brunelle – City of Redmond
- Adam Schuyler – BHC Consultants
- Road Construction Northwest - Contractor



Questions